PROJECT TITLE : Nitrate Reduction by Controlled Fermentation

PERIOD COVERED : May 1st - 23rd, 1980

WRITTEN BY : C. Ruf

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1. TRIALS

1.1. Trial NINO 57

The trial NINO 57 has been running continuously for 6 weeks although a shorter period was planned. It has been extended for several weeks due to problems with the flow measurements and the centrifuge. Because of these difficulties we did not get all the figures we need for the mass balances. However some data have already been obtained and will be confirmed in the next two weeks. We will soon be able to get a more precise balance around the fermentation by using a gas analyzer.

Experiments made in the microbiology laboratory show a lower acid consumption by increasing the pH of the extract in the fermenter (Ref. 1). Therefore we now adjust the pH at 6 instead of 5. The acid consumption comparison will be available next month.

The feedstock of lot number 7999, representing the stem part of a European RL blend, was finished on May 6th. Since then we use a new lot number, 7210, with the same composition, 55.3% FC stems and 44.7% Burley stems.

1.2. Trial NINO 58

It has been shown that the difficulties encountered with the denitration of strips extract are due to the presence of ammonium ions which inhibit the reduction of nitrates (Ref. 1). The goal of the trial NINO 58, which ran in the 20 l fermenter from 1st to 3rd May, was to reach a total denitration of a Burley strips extract by :

1) extraction at low temperature, 12°C, to avoid a decomposition of N-containing constituents into ammonium ions.

2) addition of a higher amount of sugar proportional to NO_3-N and NH_3-N concentration.

A total denitration was achieved at the end of the batch and during the first period of the continuous run.
The appendix 1 shows the simultaneous reduction of ammonium and

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nitrate-nitrogen, the consumption of reducing sugars (RS) and the growth of the micro-organisms during the batch.
After 24 hours we reduced the amount of sugar to the level corresponding to the NO_3-N concentration only. A few hours later a residual amount of nitrate was found. But unfortunately there was not enough extract and we had to stop the trial, which will be repeated.

2. NINO SCALE-UP

Mr. Frei from Chemap visited Neuchâtel on May 8th to discuss the engineering study. The basic data were confirmed to him by letter (Ref. 2).

3. PILOT PLANT

See monthly report of May 1980 : "Pilot Plant Operations" by C. Ruf.

4. NITRATE REDUCTION OF STRIPS

A rotocell extractor has been ordered from Pruess Anlagentechnik. The renting time of the Ex-Technik extractor will be extended for one or two weeks.

5. NINOMASS

The rented dryer from Aeromatic has been installed in the pilot plant.
See also monthly report : "Unit Operations I" May 1980, by P. Karbacher.

6. REFERENCES

Ref 1 : Monthly Report : "Biotechnology", April 1980, D.Schulthess

Ref 2 : Letter from H. Friedrich to Mr. Frei, Chemap, May 19th, 1980.

PROCESS DEVELOPMENT

C. Ruf

May 28th, 1980
CLR/sde

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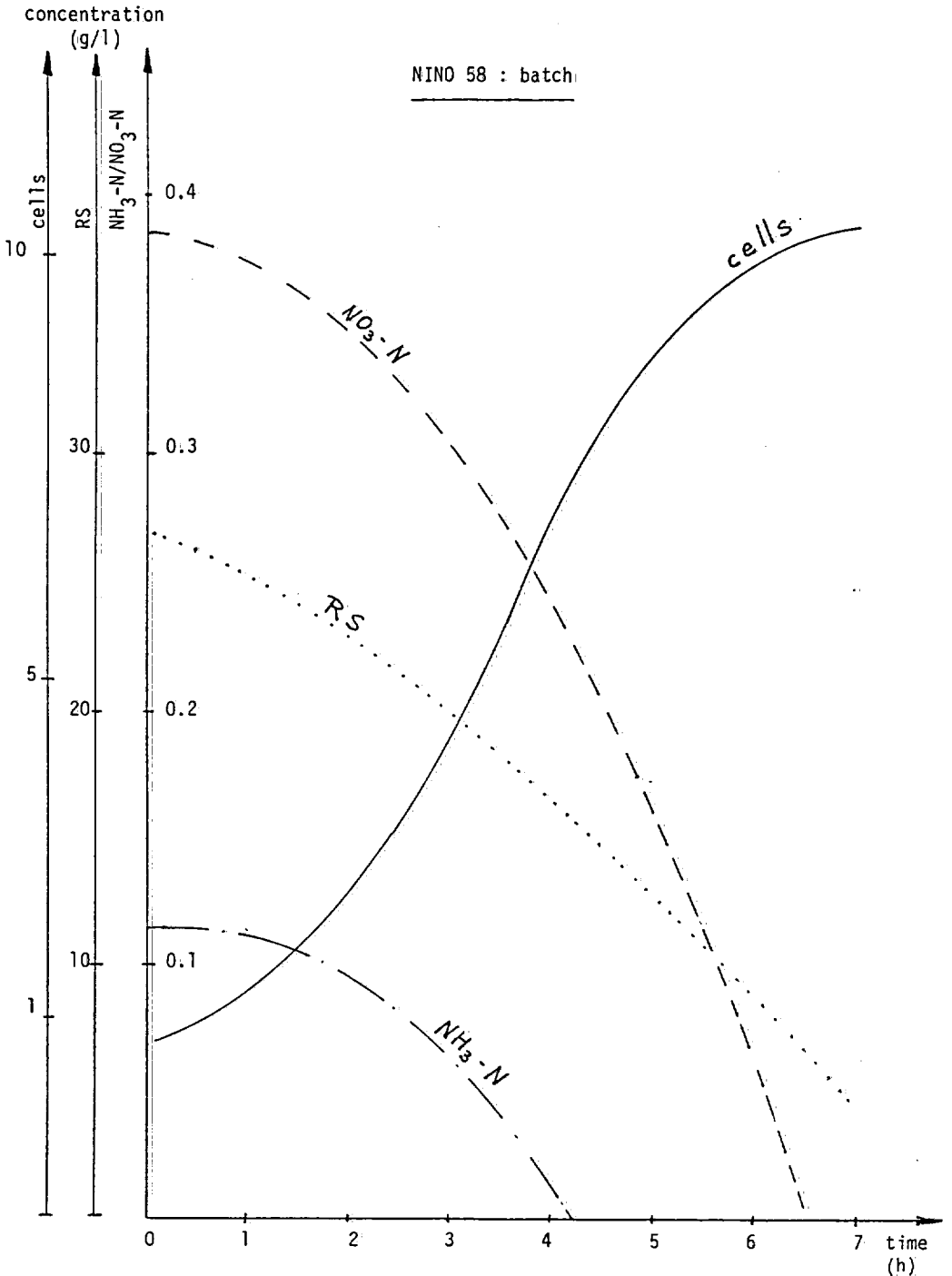
Appendix 1



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